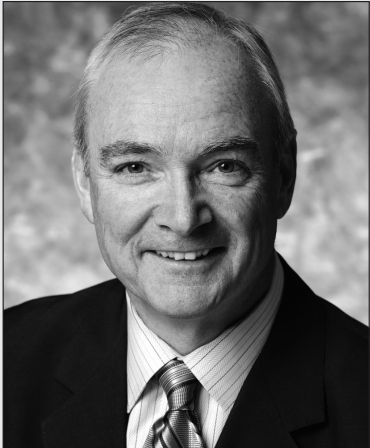


# Canada's nuclear opportunity: 60 Years in the making

An address by Hugh MacDiarmid, President & CEO, Atomic Energy of Canada Limited, at the Calgary Chamber of Commerce, February 2009



HUGH MACDIARMID  
President & CEO, Atomic Energy  
of Canada Limited.

As some of you may know, AECL has worked closely with Wayne Henuset and Hank Swartout who jointly founded Energy Alberta Corporation. They've done a tremendous job of kick starting the dialogue about nuclear in Alberta.

Bruce Power Alberta is now carrying the ball — specifically at Peace River — and we are working hard to convince them to work with AECL as a partner to develop the Alberta market.

If Canada is an emerging energy superpower, then Calgary is surely the engine — the heart of the new west in more ways than one. Most of the attention is focused on the incredible strength and abundance of oil and gas. And deservedly so.

They have made Alberta not just a prosperous energy power. They've made it an economic power, too. But I want to emphasize that there is a vibrant energy sector in Canada in addition to oil and gas.

If the first pillar of our energy infrastructure is oil & gas, and the second is hydro electric and renewable power, the third, most certainly is nuclear. These

three pillars are not mutually exclusive...far from it. They are complementary. Part of a greater whole. Sharing common skills and opportunities. They are all essential must-have parts of the total energy mix.

Three pillars. One house.

This afternoon I'd like to talk to you:

- First about the opportunities for the nuclear industry.
- Second, about the role AECL can play.
- And third, about just what's at stake.

Because it's far more than people realize. Opportunities like the one available to Canada's nuclear industry don't come around very often. In fact, they come around once in a generation. A number of factors have come together at this point in time to put nuclear power back on the agenda in a big way.

The world has an insatiable demand for power. Economic and industrial growth will lead to a doubling of electricity consumption by 2030, worldwide. And that's a very conservative estimate.

recognize the need for low-carbon sources of electrical energy.

Many modes of transportation are becoming electrified. Even car ads are speaking about electric vehicles entering the market in the next few years.

Economics and price are also driving the revival. Nuclear energy is the most cost-effective of the available base-load electricity-producing technologies.

And even with oil at forty dollars or less a barrel, nuclear is a smart long-term hedge against fossil fuel costs.

For many countries, security of supply has become a vital national concern as they realize how vulnerable they are to interrupted deliveries of oil and gas. Something they understand very well right now in parts of Eastern and Central Europe.

So diversifying energy supply makes sense. And perhaps most of all, it is the growing public support for nuclear that is most important in fuelling this revival.

**“If Canada is an emerging energy superpower, then Calgary is surely the engine — the heart of the new west in more ways than one.”**

From an existing base of 440 nuclear reactors worldwide, more than 200 additional reactors are in varying stages of development. And that's just the start.

There could be hundreds more beyond that.

Winning only a fraction of this global market represents an enormous opportunity for Canada. You rightly think of the oil sands as a valuable asset. I want you to think of nuclear the same way.

Increased awareness of the dangers and effects of climate change has led us to

Support that has been earned by many years of safe and reliable operation of nuclear plants in Canada and around the world.

Without the support — the enthusiastic support — of the communities where we are proud to have reactors and facilities... Where our employees and their families call home... Without that support — no nuclear revival would be possible.

They know that nuclear power plants are good neighbours.

Directly and indirectly providing thousands of high skilled, long term,

well-paying jobs. The kind of jobs every community wants. But we know that this growing public support is only as deep as the next incident. So we are an industry that

solution to this problem. Near-term under-water and above-ground dry storage at the reactor coupled with long-term underground management represents a

combined with oil and gas, hydro-electric and renewable power ensures Canada's status as a world energy heavyweight.

It's essential to ensure that the power we need and take for granted will always be there. And that we will be able to power new growth, here in Alberta, and across Canada and the world.

So yes, there is a worldwide nuclear opportunity, and no one is better placed to take advantage of it than Canada. Green, reliable, baseload power.

#### **Nuclear in Alberta**

We at AECL believe nuclear energy can play a role in supporting the future sustainable development of Alberta's valuable oil sands resources. We've carried out feasibility studies with several major oil sands producers on how a CANDU reactor could supply their large energy requirements.

We've looked at both surface mining projects and in situ extraction projects. We know that the steam output of one of our CANDU plants is perhaps too large for most in situ applications — the high-pressure steam can only be transported for up to fifteen kilometres.

Indeed, a smaller, higher temperature and pressure reactor might be better suited for the oil sands — but these are still on the drawing board and the challenge of low CO2 oil sands development is URGENT.

We know that nuclear plants take longer to bring into service whereas oil sands projects have a shorter total development cycle. We don't minimize the challenges. But we believe we can work with oil

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is safety obsessed. And it shows.

In Ontario, Quebec and New Brunswick, there have been commercial nuclear power plants supplying electricity to homes, businesses, schools and hospitals since 1971.

Closely regulated by the Canadian Nuclear Safety Commission, there has never been a significant accident resulting from the operations of any of Canada's nuclear power plants over the past forty years.

There is rigorous industry self-governance. Nuclear power companies in Canada and abroad demand the highest levels of quality control, extensive operator training, layered safety systems and prudent management oversight.

The World Association of Nuclear Operators — every nuclear station on the planet works together with the ultimate goal of improving nuclear plant safety, reliability and performance levels. Duncan Hawthorne, CEO of Bruce Power, is currently the Chair of the North American Centre of the World Association of Nuclear Operators.

So we have a strong Canadian presence. We know a chain is only as strong as it the weakest link. So there is never ending, rigorous self-examination.

Spent nuclear fuel — nuclear waste — is also a concern. But it's important to keep some perspective. Relatively little waste is produced by a nuclear plant.

Yes, it needs to be contained and managed — there is no denying that — but it can be done and we do have a blueprint.

In fact, we have a very sensible and practical made-in-Canada solution.

We support the Canadian Nuclear Waste Management Organization's program for the long-term management of spent nuclear fuel. It offers a long-term and cost-effective

sensible strategy.

There is, though, a Holy Grail of waste management: closing the nuclear fuel cycle — where most of the nuclear fuel waste is recycled and reused — significantly reducing the amount of nuclear waste that needs to be managed for the long term.

Are we there? No. But we will be. Research into this goal is well underway.

In Alberta you are embarking on a discussion about your nuclear future. A topic which always arouses passions on all sides. But as you engage in this province-wide conversation...I ask you to insist on facts, not hype. On information, not speculation.

That's why we at AECL welcome Premier Stelmach's appointment of an expert panel chaired by the Honourable Harvie Andre to fully examine the environmental, safety and other issues related to nuclear power.

Energy Minister Mel Knight said, and

**“We at AECL believe nuclear energy can play a role in supporting the future sustainable development of Alberta's valuable oil sands resources... And, of course, a nuclear plant can supply base load electricity to the Alberta grid to help meet growing demand for electricity while helping to reduce our overall carbon footprint.”**

I quote: “Developing an objective broad-based research paper is an important first step in having informed and meaningful discussions with Albertans.”

I couldn't agree more.

I ask you to judge us not by what people say, but by our record. Nuclear power,

companies and Bruce Power Alberta to find creative solutions.

There are also technologies for oil sands development that are still in the early stages...Technologies that would use large amounts of electricity to heat oil-bearing rock formations to release and extract oil.

The potential of this new oil sands resource is enormous and nuclear power is well suited for this application...And we can economically transmit electricity for hundreds of kilometres from the best power plant location to the extraction site.

Electricity from a nuclear plant can also be used to make hydrogen for heavy oil and bitumen upgrader plants — without consuming valuable natural gas.

We believe that Bruce Power Alberta is the right company to help bring nuclear to this province.

#### **Why AECL?**

You know, we at AECL have been in the nuclear business for more than 60 years.

Right from the birth of the nuclear industry. It's a history we are very proud of.

Canada is a nuclear vendor country. We are one of a small number of countries that

We've built reactors in Argentina, South Korea, China, and Romania.

In China, we built two CANDU reactors at Qinshan. Just a few months ago I visited our two CANDUs there to see them in action. They are top performers in that huge nation's fleet. In fact, our Chinese customer ranks the performance of his CANDUs as amongst the highest in the world.

I've also visited Romania — our reactor there — the newest in our global fleet, commissioned in 2007 — is operating at 96 per cent capacity — and that equals one very happy customer.

In Canada, the CANDU fleet of 22 full-scale reactors was put into service over a period of 20 years. They all have an outstanding safety record.

In Ontario, the top two performing CANDU reactors in 2007 were Bruce Unit 7 and Darlington Unit 1, both with a 97 per cent performance rating. Very high on a global scale.

Our newest product is the Advanced CANDU Reactor — ACR 1000 — a third generation, 1200 mega watt nuclear power plant designed specifically to meet ever-increasing market needs.

An evolution from the proven CANDU 6 platform, it combines the neutron efficiency of our traditional heavy water design with the economic advantages of light water cooling. We are bridging between heavy and light water reactors, creating a true hybrid, striking the right

**“CANDU is our workhorse. Tried, tested and true. It's fuel efficient. In fact our CANDU reactor provides more power per kilogram of uranium than any other reactor design in the world.”**

The economics are challenging, but we are getting closer to break-even, especially if we use lower priced electricity at off-peak hours.

And, of course, a nuclear plant can supply base load electricity to the Alberta grid to help meet growing demand for electricity while helping to reduce our overall carbon footprint.

So, while challenges of linking nuclear power with oil sands development are real, we believe that the reward of low carbon footprint oil sands expansion is very important for Albertans — and worth the challenge.

We know that the creative energies of Albertans and the oil industry have already been unleashed. We know Alberta and the oil sector will embrace the new challenge of finding lower carbon extraction methods - and methods that use less of another scarce resource — water.

We would like to play our part.

So we continue to believe that nuclear energy will have a role to play in Alberta.

To help Alberta diversify into a new energy business. To help create new career opportunities for young Albertans.

We hope that the expert panel commissioned last year by Premier Stelmach will reach a similar conclusion — that nuclear has a role in this province. And nuclear plants are good neighbours — you only need to visit the communities near Bruce Power's nuclear facility in Ontario to see strong community support firsthand.

Bruce Power Alberta has started public consultation in the Peace River region and we know they are committed to a public dialogue.

have designed and sold nuclear reactors around the world.

We are respected here and abroad for the quality of design, operating costs and durability of our reactors. We are ready to deliver with our technology.

Now, I don't want to go into a nuclear lecture, but please permit me a moment to talk about our reactors and what makes them unique.

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It has on-power fuelling technology that

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allows longer durations between planned maintenance outages, and increases the lifetime capacity factor of our reactors.

It meets the highest environmental standards with a safety record spanning 1,000 reactor years of operation worldwide.

It's valued here and around the world for its dependability, high lifetime capacity factors, low operating costs, and its record of on time and on budget construction.

We have CANDU reactors that are succeeding for our customers, around the world and most importantly right here in Canada.

balance of performance and cost while achieving the highest standards of safety.

A 2008 assessment of nuclear reactor technology by UX Consulting rated our ACR1000 as tied for first among 14 reactors evaluated. So...our development and deployment program for the ACR1000 is on track.

Right where we planned to be:

- In our design engineering.
- Our licensing.
- And construction planning.

We are on track to meet the market window. We have the right product.

But the most important factor in the success of our reactors is the strength of the entire nuclear community.

We have in this country a nuclear network of businesses and academic and public sector institutions that represents an unparalleled set of skills, and that stands ready to take advantage of this global opportunity.

It includes our Team CANDU partners.

And partners like the over one hundred Canadian small and medium sized suppliers that make up the Organization of CANDU Industries — 30,000 employees — more of which I'd like to see here in Alberta.

We need the backing of our partners across Canada. We need the highly educated and skilled 5,000 men and women who work at AECL. They are the intellectual powerhouse behind everything we do.

When we sell a CANDU reactor domestically and overseas, here's what it means to Canada:

- According to a recent StatsCan report, two new CANDU units built domestically will generate five billion dollars in Canadian GDP and 62,000 person-years of employment.
- The Canadian Energy Research Institute estimates that the export of a pair of CANDU nuclear reactors adds one billion dollars to the Canadian GDP and 17,000 person years of employment in Canada.

The benefits to Alberta are also large:

It's a unique opportunity here. For the first time in our nation's history, nuclear is being considered to power a specific industry. So, does nuclear energy have a role to play in Alberta?

information highway. This highway's on ramps are entrepreneurship, creativity and a commitment to excellence. Qualities found in here in abundance.

For those who seek them, the potential prizes associated with the growth of this industry over the next twenty years are remarkable.

So let me be blunt:

It's about jobs. Plenty of them. Highly skilled, well paying, long-term jobs.

Are the stakes high? You bet!

Think about what this means for our country. We are on the threshold of a once-in-a-generation opportunity. We have the chance to build on a vital sector in Canada with the potential to equal or surpass some of our largest manufacturing sectors. One that is truly national in scope.

That creates wealth and opportunity for all Canadians. In light of recent economic developments, we can't take for granted that the jobs we have today will be around tomorrow. Economies change. What is economic history but the history of sudden change and unexpected turns?

As the classical economist Joseph Schumpeter once said, capitalism "is a perennial gale of creative destruction."

Even here in Alberta, haven't the last few months show that to be true?

Those who are prepared to adapt and innovate will prosper. Those who don't will disappear and new ones will take their place.

We are at such a moment.... We want Canada to be a leader not a follower.

A provider not a taker. AECL is ready to be a world-class Canadian champion, able to compete head-to-head with the best in the world. A home-grown Canadian supply sector. With Canadian CANDU reactors providing safe, reliable, economic and sustainable power for the next 60 years.

Thank you!

**“Even in these tough economic times we must find ways to create value. Uncover opportunities. Unleash competitive juices. This is the time for nuclear. This is the time to make our own way forward. To be one of the true growth engines of Canada's future economy.”**

Universities, colleges, utilities and governments — we all play a role in the success of this industry.

#### The Stakes

At AECL we have the technology, the team, and the record — to take on the world...and we will. We are going to think aggressively and ambitiously about how we can reshape our future.

Even in these tough economic times we must find ways to create value. Uncover opportunities. Unleash competitive juices. This is the time for nuclear. This is the time to make our own way forward. To be one of the true growth engines of Canada's future economy.

Absolutely!

All of these economic benefits, plus potentially thousands of new career opportunities — direct and indirect. Scientists, engineers, technicians, software developers...

When you build a nuclear power plant, you aren't just building a facility and staffing it. You're building an industry. One that is different from those of the last century.

The nuclear supplier network does not have to be within twenty kilometers of highway 401 running through Toronto and Ontario. In this industry, the supplier network needs to be located close to the